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ASSESSING OSTEOPOROSIS LEARNING NEEDS AND PREFERENCES OF EXERCISE PHYSIOLOGISTS

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ABSTRACT

Sollis PD, Cisar CJ. Assessing osteoporosis learning needs and preferences of exercise physiologists. ***JEP****online* 2008;11(3):13-19. Research has revealed substantial knowledge deficits regarding osteoporosis among various healthcare professionals, such as physicians, nurses, and physical therapists. However, no previous studies have addressed the levels of knowledge regarding osteoporosis among exercise physiologists working in a cardiopulmonary rehabilitation setting. It is essential that exercise physiologists have a thorough understanding of osteoporosis so they can ensure client safety and provide accurate information to the client and support group. The purpose of this project was to evaluate the levels of knowledge about osteoporosis among exercise physiologists working with clients who are at high risk for fragility fractures. Ninety-six exercise physiologists (female = 63, male = 33) working in cardiopulmonary rehabilitation clinics throughout the United States were randomly selected and completed a three component survey, which included a 21-item osteoporosis knowledge test. The scores ranged from 11 to 20 with a mean score of 16.3 ± 1.7. Fifty percent of the respondents scored lower than 80% on the test. The major areas of knowledge deficit found were related to disease prevalence, nutritional relationships, and prevention. Additional findings suggest journal articles, websites, pamphlets, and presentations are the preferred methods for learning among exercise physiologists. These findings are vital for guiding educational programs aimed at improving the osteoporosis related knowledge base of exercise professionals working with clients at high risk for fracture.

Key Words: Knowledge, Awareness, Education, Disease Management.

INTRODUCTION

According to the 2004 Surgeon General's Report on Bone Health and Osteoporosis, 10 million people in the U.S. over 50 years of age have osteoporosis of the hip. The report also mentions that about 4 in 10 women and 1 in 10 men over 50 years of age will break a hip, spine, or wrist. In addition, it has been reported that most patients at high risk for fractures do not receive adequate evaluation or treatment for prevention of future fractures, and that most patients who are diagnosed as having fragility or low-impact fractures are not being evaluated or treated for osteoporosis (1).

These statistics are concerning for exercise physiologists working in cardiopulmonary rehabilitation clinics with clients who are at high risk for fractures. Since low to moderate intensity aerobic and resistance exercise is recommended for cardiac and pulmonary rehabilitation protocols, exercise physiologists must be aware of exercise limitations and safety concerns when prescribing and supervising exercise regimens for clients at high risk for fractures (2).

Several investigations have addressed knowledge regarding osteoporosis among various healthcare professionals (3,4,5,6,7). Gaps in knowledge about osteoporosis prevention and treatment have been found among different health professionals (3-7). However, a review of the current literature revealed no investigations into knowledge regarding osteoporosis among exercise physiologists. One of the priorities for future research brought about by the 2000 National Institutes of Health Consensus Conference is the need to study the most effective method of educating the public and healthcare professionals about the prevention, diagnosis, and treatment of osteoporosis (8).

Part of the rehabilitation process is educating patients and their caregivers about the serious nature of skeletal disorders such as osteoporosis (9). Exercise physiologists are in a unique position to act as osteoporosis management advocates. They need to take greater responsibility for increasing their own and the public's awareness of osteoporosis. Therefore, it is important to determine what areas of knowledge about osteoporosis are deficient among exercise physiologists. It is also important to explore the preferred methods for learning more about osteoporosis in order to help improve the overall management of this disease.

METHODS

Subjects

Ninety-six exercise physiologists working in cardiopulmonary rehabilitation clinics throughout the U.S. responded to a three component survey sent to them in the mail, which represented a 40% response rate. All of the participants had a Masters degree except 6, five of whom had a PhD and one had a Bachelors degree. Number of years of experience ranged from 2 to 34 yr.

Procedures

Prior to beginning the study, approval from the Human Subjects – Institutional Review Board at San Jose State University was obtained. Participants were randomly selected from membership directories of the American Association of Cardiovascular and Pulmonary Rehabilitation, and the California Society of Cardiac Rehabilitation. A survey packet containing a cover letter, demographic questions, preferred method of learning questions, and the 22-item Osteoporosis Knowledge Questionnaire (OKQ) were sent to each participant, along with a self addressed return envelope. Participants were advised that the completion and return of the survey would indicate their consent to participate in the study. Participants were asked to complete the OKQ using only their current knowledge of osteoporosis without any additional inquiry and anonymously return the packet.

Instrumentation

The OKQ is the only instrument designed to assess knowledge about osteoporosis among healthcare professionals. Although the OKQ was designed to evaluate knowledge of osteoporosis among nurses, it was determined they have the same knowledge base and professional goals as exercise physiologists (4). These goals include prevention and management of osteoporosis, education, identification of risk groups, and monitoring and provision of psychological support to affected individuals and their relatives (5). The OKQ has been used in other research to evaluate levels of knowledge about osteoporosis among various healthcare professionals, such as physical therapists, orthopaedic technologists, and nuclear medicine technologists.

The OKQ content areas include: (1) prevalence of osteoporosis; (2) risk factor identification; (3) physical signs of the disease; (4) preventive measures; (5) diagnostic measures; and (6) treatment. Question 20 of the original OKQ was omitted because recent research has deemed it invalid. This reduced the total number of questions from 22 to 21. Out of a possible score of 21, the number of correct answers was summated to give a measure of overall knowledge about osteoporosis.

The OKQ was evaluated by seven osteoporosis experts (five rheumatologists and two advanced practice nurses) to determine content validity. The OKQ content validity was determined to be .955 (4). Test/retest reliability of the OKQ was determined over a 2 week interval and assessed by the Pearson product-moment correlation. Stability of the instrument over a 2 week period was .77 (4).

Figure 1.

Participant Responses on Osteoporosis Knowledge Questionnaire

Question (correct response in bold)	% correct
1. By current estimates, what percentage of American women older than age 50 will develop osteoporosis?	49.0
___ 30%.	
_X_ **50%**.	
___ 70%.	
___ 90%.	
2. Women begin to lose bone mass at what age?	63.5
___ In their 20's.	
_X_ **In their 30's.**	
___ In their 40's.	
___ After age 50.	
3. Which of the following does not increase the risk of developing osteoporosis?	86.5
___ Being a female.	
___ Family history of osteoporosis or hip fracture.	
___ Smoking.	
_X_ **Low-salt diet.**	
___ Lack of exercise.	
___ White or Asian race.	
___ Thin, small-boned body frame.	
___ Alcohol abuse.	
___ Early menopause, such as hysterectomy and removal of ovaries before age 50.	
4. The most serious fracture caused by osteoporosis that can be life threatening is:	75.0
___ Wrist fracture.	
_X_ **Hip fracture.**	
___ Spine fracture.	
___ Ankle fracture.	
5. Which of the following may be a sign of osteoporosis?	92.7
___ Stiff/painful joints.	
___ Swollen/red joints.	
_X_ **Loss of height.**	
___ Shiny/stiff joints.	
6. What is the recommended daily intake of calcium for women aged 40 to 49 who are still menstruating?	30.2
___ 800 mg.	
_X_ **1,000 mg.**	
___ 1,200 mg.	
___ 1,500 mg.	
7. Food products (e.g. orange juice) fortified with calcium generally provide approximately how much calcium per serving:	33.3
___ 100 mg.	
___ 200 mg.	

_X_ **300 mg.**
___ 400 mg.
___ 500 mg.

8. Which of the following is considered the best preserver of bone mass in women? 47.9
___ Calcium.
_X_ **Estrogen.**
___ Vitamin D.
___ Bisphosphonates.

9. Osteoporosis literally means: 96.9
___ Arthritis.
___ Increased bone mass.
_X_ **Porous bone.**
___ Senile bone.

10. Currently, the most widely accepted method to determine whether or not you have osteoporosis is: 95.0
___ Hip x-ray.
_X_ **Bone densitometry (DEXA).**
___ Bone scan.
___ Computed tomography scan.

11. It is best to take calcium supplements (pills): 78.1
___ First thing in the morning on an empty stomach.
___ All at once just before bedtime.
_X_ **In divided doses with meals.**
___ In divided doses on an empty stomach.

12. If you use sunscreen or avoid direct sun exposure, which of the following is the recommended amount of daily vitamin D intake needed to help absorb calcium? 69.8
___ 100 to 200 IU.
_X_ **400 to 800 IU.**
___ 1,000 to 1,500 IU.
___ 4,000 to 8,000 IU.

13. Which of the following is NOT an example of weight-bearing exercise? 100
___ Dancing.
___ Stair-climbing.
___ Walking.
_X_ **Stretching.**

14. Which of the following medicines is used to treat osteoporosis? 94.8
___ Prednisone.
___ Ibuprofen.
_X_ **Bisphosphonates.**
___ Aspirin.

15.Which of the following is the best source of dietary calcium? 89.6
___ Carbohydrates.
___ Green, leafy vegetables.
___ Proteins.
_X_ **Dairy products.**

16. Which of the following statements is **NOT** correct? 49.0
___ Osteoporosis is a preventable disease.
_X_ **Decreasing bone mass is part of the normal aging process.**
___ Women reach their peak bone mass in their 20's.
___ Osteoporosis occurs in men.

17. Once a woman begins to lose bone mass: 100
_X_ **Treatment is available to minimize further loss of bone mass.**
___ Nothing can be done to prevent further loss of bone mass.
___ She will develop arthritis.
___ She will experience hip pain

18. Which of the following most accurately describes measures to prevent osteoporosis? 100
___ Taking the recommended amount of calcium daily.
___ Weight-bearing exercise 4 to 5 times weekly for 30 to 45 minutes.
___ Avoid smoking.
_X_ **All of the above.**

19. Taking certain medicines for long periods of time may increase your risk for developing osteoporosis. 97.9
An example of such a medicine is:
_X_ **Prednisone.**
___ Aspirin.
___ Tylenol.
___ Insulin.

20. Taking hormone replacement (estrogen) after menopause may: 86.5
___ Increase bone loss.
_X_ **Decrease bone loss.**
___ Increase fracture risk.
___ Decrease memory.

21. Which group of activities best describes weight-bearing exercises? 100
___ Walking, jogging, isometrics, stretching.
___ Tennis, swimming, yoga, karate.
_X_ **Hiking, dancing, tennis, stair-climbing.**
___ Hiking, swimming, stretching, jogging.

Statistical Analyses

Descriptive statistics were used to summarize the demographic characteristics, scores on the osteoporosis knowledge test, and responses to osteoporosis information needs questions. Results are expressed as mean (± standard deviation) for continuous variables, and number (percent) for categorical variables.

RESULTS

Ninety-six respondents (female = 63, male = 33) met the criteria for inclusion in this study. The requirement was to be an exercise physiologist working in cardiopulmonary rehabilitation in the U.S. Ages of the participants range from 27 to 64 year of age, with an average age of 42.2 year. Ninety-one percent of the respondents have professional certifications in addition to their degree, with exercise specialist being the most prevalent (56%). The average years of experience was 14.7 year with a range of 2 to 34 year. Out of a possible score of 21, the mean score was 16.3. The OKQ scores range from 11 to 20 out of a possible 21. About 50% of the respondents scored below 80% on the OKQ. Pearson product-moment correlation analysis revealed that years of experience was not related to OKQ scores ($r=.19$, $p>.05$). Comparison of the female (n=63) and male (n=33) scores on the OKQ utilizing an independent t-test revealed that the female scores (16.6 ± 1.5) were significantly higher ($t=2.4$, $p<.05$) than the male scores (15.7 ± 1.9).

Table 1. Characteristics of Study Participants (n=96)

	Mean	*S.D.*	*Range*	*Median*
Age (yr)	42.2	(± 8.8)	27 - 64	42
Years of Experience	14.7	(± 7.1)	2 - 34	15
OKQ Score	16.3	(± 1.7)	11 - 20	16

DISCUSSION

According to current data, 18 million Americans are estimated to have osteopenia, and 10 million more have osteoporosis (2). In 2005 U.S. expenditures on osteoporosis and associated fractures were $21 billion. Because Americans are living longer due to technological and medical advances this cost could exceed $250 billion by the mid-21st century (10). This devastating disease accounts for more than 1.5 million fractures per year (10). These fractures can have a major impact on a person's quality of life. Behavioural risk factor modification can prevent or deter the development of osteoporosis. Combinations of lifestyle modifications, nutritional choices, and weight-bearing exercise can increase bone mass and effectively reduce the risk of osteoporosis (4). Exercise physiologists are part of the multidisciplinary team of healthcare providers involved in the rehabilitation of patients with a high risk of fragility fractures.

This study revealed that there is a need to increase the knowledge base regarding osteoporosis among exercise physiologists working in cardiopulmonary rehabilitation settings within the U.S. The major areas of knowledge deficit found in this study were regarding disease prevalence, nutritional relationships, and prevention. Only 30% of the respondents are aware of calcium recommendations based on age group. Only 33% of the respondents correctly identified average calcium quantities in fortified foods. Only 48% of the respondents identified estrogen as the best preserver of bone mass in women. These findings are similar to other inquiries regarding the knowledge levels about osteoporosis of healthcare professionals (3-7).

In a previous study the OKQ was administered to eighty-one nurses before and after an educational program (4). The program was designed to provide basic facts about osteoporosis, to suggest behaviour changes that can help reduce the risk of developing the disease, and to stress the importance of bone density testing to screen for osteoporosis. The investigators reported that the nurses OKQ score before the intervention was relatively low and similar to those of the general public (4). Following the educational program, the nurses' knowledge of osteoporosis increased significantly, and 78% of the nurses indicated they were more likely to discuss osteoporosis with patients.

Another study found gaps in osteoporosis knowledge among nurses and other health professionals working with individuals at high risk of osteoporosis related fractures (3). The investigators found large gaps in nutrition-related items, amount of calcium in fortified foods, and osteoporosis prevalence. Educational materials should be tailored to exercise physiologists so that they can improve disease management and reduce fracture rates.

CONCLUSIONS

Osteoporosis is an under recognized and under treated disease that is on the forefront of public health concerns (1). Osteoporosis is hard to detect, due to the fact that it is asymptomatic until a fracture occurs. It has been reported that only 0.33 of vertebral fractures were diagnosed and received medical attention (11). Exercise physiologists are a large group of healthcare providers who are in a unique position to help reduce the morbidity, mortality, and the financial burden on society caused by this largely preventable disease.

Because research has revealed deficits in knowledge relating to osteoporosis among various healthcare providers, it is necessary to determine the depth of osteoporosis knowledge among exercise physiologists working with clients at high risk for fracture. With this information we can guide future educational interventions offered to exercise professionals caring for fragile patients.

Educational programs offered to exercise physiologists working in cardiopulmonary rehabilitation clinics should focus on osteoporosis prevalence, osteoporosis nutritional factors, and osteoporosis prevention. Journal articles, websites, pamphlets, and presentations should be utilized for the delivery of osteoporosis knowledge. Future research should be directed towards investigating the safety of various forms of exercise for individuals with osteoporosis, and towards the most effective way of educating healthcare professionals on all aspects of osteoporosis.

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